HarborSym: Simulation Model for Deep Draft Navigation Improvements

Start Date: Sep 2004

Projected End Date: Oct 2007

Lead Researcher(s):

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Problem Addressed:

The Corps is responsible for maintaining navigable channels leading into the nation's coastal ports and harbors. As new, larger ships enter the world fleet, existing channels may require deepening or widening or new channels may need to be created. Establishing the need for such modifications requires detailed economic analyses. Assessing the benefits of such modifications requires a holistic examination of vessel traffic into the port, which can best be achieved through a simulation model.

Objective:

This study focuses on the development of HarborSym, a simulation model that allows planners to analyze the economic impact of channel- widening projects. HarborSym calculates transit times and transportation costs by predicting vessel interactions based on user-provided vessel trip data and harbor transit rule information. Unproductive wait times result when vessels are forced to delay sailing due to transit rules and the movement of other ships within the system. HarborSym captures these delays. Using the model, analysts can calculate changes in transportation costs that will result from proposed modifications to channel physical dimensions. Additional modules are being developed to support HarborSym deep draft navigation analyses. To assist with the input data requirements and development of future shipment lists, a Vessel Call Analyzer and Commodity Driven Forecast Tool will be created. The HarborSym Animation Module (HSAM) provides post processing visualization of HarborSym outputs through three dimensional avatars. After the widening version of HarborSym is fielded, a version will be developed to calculate the benefits of deepen a channel.

Benefits:

HarborSym will allow users to analyze changes within a port system without modifying complex computer codes. Users will be able to create models for specific harbors using a graphic interface and populate and manage information related to port infrastructure, traffic movements and harbor rules. Vessel movements will be animated during the simulation making it easier for users to determine if the model is accurately representing their system. Through the post processing visualization module, HSAM, the model capabilities and outputs can be demonstrated to decision makers and stakeholders. The model will enable planners to more accurately predict the benefits of channel-widening projects. It will provide a "transparent" approach to channel-widening analyses that can be duplicated by outside researchers.

Status:

In progress. The beta version of the HarborSym widening model and HSAM visualization tool can be downloaded from the HarborSym website (see below). Training has been conducted successfully and is offered trough the DD-PCX in Mobile, AL. The model is currently being fielded on two USACE channel widening studies. Work has begun on the Vessel Call Analyzer, Commodity Driven Forecast Tool, and deepening version of the model.

Contract Data:

130465, C2000, C5010

Progress:

Presentation by Shana Heisey Olig *(2.0 MB, ppt)*

Presentation by David Moser, Keith Hfseth, Shana Heisey, Richard Males, and Cory Rogers *(5.0 MB, ppt)*

Presentation by Keith Hofseth, Shana Heisey-Olig, Cory Rogers, William Woelbeling, Richard Males, October 20,2005 *(2.51 MB, ppt)*

Presentation by Richard Males, Mar 12,2006 *(5.9 MB, ppt)*

Conference Poster by Cory Rogers, Keith Hofseth, May 15,2006 *(1.1 MB, pdf)*

Presentation by Richard Males, Keith Hofseth, Cory Rogers, Shana Heisey, May 15,2006 *(2.8 MB, pdf)*

Design Document(Initial Draft) by Richard M. Males, May 3,2007 *(387 KB, pdf)*

Products (Bookshelf/Toolbox):

Paper by David Moser, Keith Hofseth, Shana Heisey, Richard Males, Cory Rogers, July 2004 *(716 KB, pdf)*

Paper by Shana Heisey, July 2005 *(1.04 MB, pdf)*

HarborSym Model (web link) *(html)*

Paper by Cory Rogers, William Woelbeling, Richard Males, Keith Hofseth, and Shana Heisey, October 20, 2005 *(674 KB, pdf)*

Paper by Keith Hofseth, Shana Heisey, Richard Males, Cory Rogers, Jul 15,2006 *(580 KB, pdf)*

Paper by Keith Hofseth, Shana Heisey, Richard Males, Cory Rogers, Jul 15,2006 *(1.1 MB, pdf)*

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Related Links:

HarborSym

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